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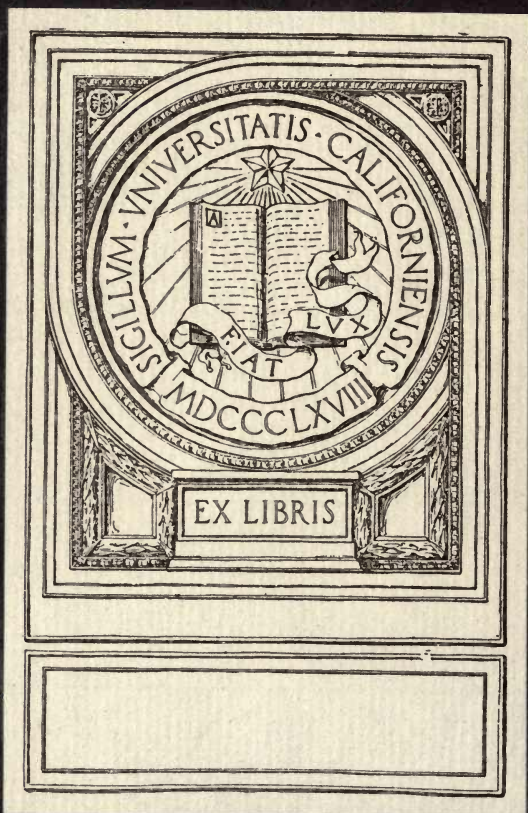
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CHICAGO
ACADEMY OF SCIENCES.

ANNUAL ADDRESS.

1878.



CHICAGO

ACADEMY OF SCIENCES.

ANNUAL ADDRESS

READ BY

E. W. BLATCHFORD, A. M.,

PRESIDENT OF THE ACADEMY,

JANUARY 22, 1878,

WITH THE REPORTS OF THE

SECRETARY AND TREASURER.



PRINTED FOR THE ACADEMY.

1878.

TO VILL
ABROUAC

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1878'''

OFFICERS
OF THE
Chicago Academy of Sciences
FOR THE YEAR 1878.

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HENRY H. BABCOCK, A. M.

Vice-Presidents,

WILLIAM BROSS, A. M., HOMER N. HIBBARD, A. M.

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SELIM H. PEABODY, PH.D.

Librarian,

Recorder,

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E. W. BLATCHFORD,

J. S. JEWELL, M. D.,

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E. ANDREWS, M. D.,

S. W. BURNHAM.

Committee on Membership,

E. W. BLATCHFORD,

S. H. PEABODY,

CHARLES ADAMS, M. D.

ADDRESS.

Members of the Academy, and Ladies and Gentlemen :

To-night we pass another mile-stone in the history of our institution. It seems appropriate that as we enter upon the new year, a brief review be taken of that just closed.

According to the provisions of our constitution, the work of the Academy is twofold—the collecting of objects of natural history and of scientific interest in the Museum, and the study and development of scientific knowledge by means of the essays and discussions at the monthly meetings—the Library being a necessary aid in each of these departments.

What has the year 1877 accomplished for the Academy in these directions? The report just read by our Secretary presents quite fully the good work which has been done in connection with our MUSEUM during the past year. Its results in the number and the variety of the additions made, are gratifying. In the present incomplete condition of our museum catalogue, it is not possible to state with accuracy the number of specimens we possess. We are safe, however, in placing the number as follows :

MAMMALS	66
BIRDS—Mounted	765
Skins	1,340
	2,105
OÖLOGY—Eggs	1,800
Nests	75
	1,875
FISHES	177
REPTILES	51
CRUSTACEANS	50
CORALS	300
SHELLS	15,000
INSECTS	6,000
SKELETONS	5
CASTS	150
BOTANICAL SPECIMENS	2,300
MINERALOGICAL SPECIMENS	500
PALEONTOLOGICAL “	1,200
ARCHÆOLOGICAL “	270
Total number of specimens	30,049

Of this collection it may be said that the prominent mammals of North America are here well represented. Of birds we have specimens of all the orders but the ostrich, and of most of the families of North American birds. We have a fair representation of the fresh-water fishes of the country, also a good collection of shells, and a very nearly complete collection of Florida corals.

In this connection we gratefully recognize, and not for the first time, the valuable services of our faithful life member, Dr. J. W. VELIE. In the winter of 1871 and 1872 Dr. VELIE accompanied our lamented STIMPSON to the Gulf, and such time as could be secured from his constant and kindly ministrations to the invalid in his feeble and rapidly declining condition, was devoted to collecting and preserving specimens, principally from the strait between Cuba and Yucatan. Dredgings were also made off the Florida Keys, from Key-West to Sombrero, which were sent to Prof. AGASSIZ, at the Cambridge Museum. Dr. VELIE made a second trip to the Gulf in January, 1875, when collections were made from the Gulf Stream, from the Tortugas to Key Vaccas; and upon the mainland of Florida, from Cape Sable as far north as Charlotte's Harbor. The third trip was made in the winter of 1876 and 1877, when the Florida coast was examined from Cedar Keys to Key-West, and most of the rivers ascended, some as high as thirty miles. These expeditions have been productive of rich results, and have added largely to our collections of mammals, birds, eggs, shells, corals and fish. Justice to Dr. VELIE's work demands this statement in addition to the acknowledgements voted by the Academy and the graceful tribute in our Secretary's report.

Our Museum secured valuable additions of shells through one of our resident members, W. W. CALKINS, Esq., during his two expeditions to Florida, in which both the eastern and the western coasts were partially examined. The value of these services have been previously recognized by the Academy.

THE LIBRARY.

The monthly statements presented to us by the Librarian have prepared us for the favorable results detailed in the full annual report, which has been made this evening. The present good condition of the Library is due to the patient labor of our Librarian

and Secretary, who for the past fourteen months has been engaged upon it, together with work connected with the Museum. While much remains to be done, it has yet reached the condition when every volume, pamphlet or document is so arranged and catalogued as to be readily found when needed. This work we hope to have prosecuted; and thus will our comparatively small collection, thoroughly indexed, prove, for scientific aid, of more value than a larger one not so carefully classified. Were we able to resume the publication of our Transactions, our Library, and, indeed, our Museum also, would receive large and valuable accessions, both by donations and exchange. In several departments of science we could furnish material for such publications had we the means to expend.

THE MONTHLY MEETINGS.

The second mode through which the influence of our Academy is exerted, demands a brief consideration. In estimating the growth of the Academy hitherto, and in forecasting its future development, this is a most important element.

During the last year papers have been read before the Academy, by its members, on the topics named:

- Dr. EDMUND ANDREWS, three papers—
 Soundings in Geneva Lake.
 Memorials of Col. J. W. FOSTER, LL.D., former Pres. of the Academy.
 Formation of Caves and Ravines.
- Prof. ELIAS COLBERT, three papers—
 On the Meteor of 1876.
 Star Conflagrations.
 The Perturbations of the Moon's Motion.
- Prof. S. H. PEABODY, three papers—
 On *Cephalopterus Vampirus*.
 Memorials of Col. J. W. FOSTER.
 On the Blue Ray.
- Hon. WM. BROSS, two papers—
 On Archæological Remains at Morris, Illinois.
 Notes of a Trip to Starved Rock and Deer Park.
- Dr J. H. HOLLISTER—
 On the Adoption of the Metric System.
- S. W. BURNHAM, Esq.—
 On Recent Observations of Double Stars.
- Prof. A. D. HAGER—
 On the Culture of Shad.
- Prof. T. P. REINSCH—
 On a Meteoric Stone Found in Illinois.
- W. W. CALKINS, Esq.—
 On the Geology of Alachua County, Florida.

L. STONE, Esq.—
On Plant Distribution.

Dr. J. S. JEWELL—
On Recent Researches on the Structure and Modes of Action of the Brain.

E. S. CHESBROUGH, Esq.—
On the Davenport Tablets.

H. N. RUST, Esq.—
On Prehistoric Graves in the Vicinity of Nashville, Tenn.

Dr. J. W. VELIE—
A Report on the Third Florida Expedition for the Collection of Specimens for the Academy.

A discussion was also held upon The Physical and Medical Influence of the Blue Ray, a paper being read by Dr. J. H. TUCKER.

This brief enumeration of these papers gives an inadequate idea of the real value of the meetings. The discussions called out at the time, and the subsequent discussions of these and kindred topics among the members, indicate the purpose, the legitimate influence, and the power of the Academy in this department of its work. During the past year we are able to recognize a marked increase in the interest and value of these meetings. It has shown itself in the larger attendance, in the increased number of carefully prepared papers presented, and especially in the wider range of topics discussed. The improvement of these meetings is a subject that has occupied the careful attention of your officers; and much of what has been accomplished is due to the wise planning of our Secretary. But in order to develop these interests yet more fully, it is essential that all members, working in special lines of investigation, should feel it their bounden duty to share with the Academy some of the results of their study. We are greatly favored in having among our resident membership an unusual number of specialists. Astronomy, Botany, Geology, Archæology, Entomology, Chemistry, Ornithology, Conchology, and Microscopy — each has among us, at almost every meeting, a representative. With such a range of talents and tastes, certainly our meetings should not lack in interest. I am aware of the great inducement to the presentation of original papers which an ability to publish our proceedings would present, both to our resident and corresponding membership. From this stand-point is derived perhaps the strongest argument in favor of resuming this work, to which allusion has previously been made.

The provision in our constitution for the encouragement of specific investigation by the formation of Sections of the Academy, has, perhaps, not received the attention it deserves. This is an important means of securing thorough work in many different departments of investigation, while making our Academy the center of all, and the dispenser to each of whatever of value pertains to our institution.

THE PROGRESS OF SCIENCE.

After such a review of the year's work as has been presented, I know you sympathize in the reflex wave of feeling, "How little has been accomplished!" How little when contrasted either with our hopes and purposes and aspirations, on the one hand, or the vast field inviting to research, on the other. But in the grand world-field of scientific investigation the working brotherhood is large, and the smallest constituency may rightfully draw upon and appropriate the strength and vitality of the whole. Advancing over the world, in every zone, on land and on the sea, do we find this fraternity, applying to nature's mysteries the wealth of intelligent research and patient investigation. Sounding and dredging the seas, and threading the rivers of tropical latitudes; detecting and measuring the force of the shoreless rivers of mid-ocean, and mapping for commerce their invisible pathways; reducing to law the wayward play of the winds, the phenomena of the upper air; forcing the barriers of ice and cold and darkness, which for ages have safely guarded the mysterious polar centers; dauntlessly searching the labyrinths of mines and caves, descending the sulphurous depths of the volcano, and anon breathing the tenuous air of the loftiest peaks of both hemispheres; unearthing from bog and plain the crumbling skeletons of animals and men,—fit contemporaries in those prehistoric ages; supplementing the discoveries of nature's lenses with the microscopic treasures of the near, and the telescopic revelations of distant worlds.

What answers have come to their toilsome quest? Most briefly may we allude to a few of the more noticeable among the many responses.

In *Astronomy*. The location here of the Observatory, with its grand telescope, and its great success as now employed, warrants a first reference to this subject. Mr. S. W. BURNHAM occupies

himself exclusively upon double stars, embracing two departments—the search for new doublets, and the careful observation and measuring of old objects, which had been neglected, or were supposed to be single, and the correction of errors in former measurements. His catalogue, now in course of publication by our government, an issue which astronomers in this country and abroad are awaiting with interest, will reveal the valuable results which have been here accomplished—results which may be considered most honorable to our young city. Mr. BURNHAM is in constant correspondence with eminent astronomers engaged in the same field, in Europe and America. HALL, of the Washington Observatory; STONE, of Cincinnati, and PICKERING, of Cambridge, the latter engaged largely upon photometric work, may be specially mentioned in this country; while abroad, we may allude to FLAMMARION, of Paris, who is to France, as a writer, what PROCTOR is to England; to STRUVE, Director of the Pulkowa Observatory; to DEMBOWSKI, of Milan; to WILSON, of Rugby, and GLADHILL, of Crossley's Observatory, in England; and to DOBERCK, in Ireland.

The great event in Astronomy of the past year,—and the most important for many years,—the discovery of the two satellites of Mars, on the 14th and 18th of August, by ASAPH HALL, at the Washington Observatory, occurs to you all. I can only allude to the discovery made by Prof. DRAPER, of New York, of oxygen in the sun,—important as a step towards ascertaining the constituent elements of this body. It is pleasant to note that our country has the honor of these, the two important discoveries of 1877. Possessing two instruments, among the first in the world, the one here with an object-glass of eighteen and one-half inches, and that of the Washington Observatory of twenty-six inches in diameter, we may reasonably hope to keep abreast of astronomical discovery.

For acquaintance with the advances in the science of *Electricity*, in its manifold applications, Chicago affords admirable opportunities. A visit to the extensive manufactory of electrical instruments, in the North Division, and to the head-quarters of the Western Union Telegraph Company, where the instruments may be seen in use, would prove the assertion. I can but name a few of the advances made in this department of science during the year.

A practical application of the multiple system of telegraphy has been made, by which, while terminal offices are using a wire, intermediate offices may work it at the same time, without in the least interfering one with the other. This improvement over the duplex or the quadruple system, is the invention of ELISHA GRAY, of our own city. I may also mention a practical application of the telephone, by which the human voice, or several voices, with all their individual peculiarities, may be transmitted over an ordinary telegraph wire, without the use of a battery; also, the production of the phonograph, by which the human voice may be recorded, and reproduced after the lapse of any period of time. Improvements in the electric light are in progress, whereby former difficulties have been to some extent overcome, the expense reduced, and larger results attained.

In the department of *Chemistry* and *Physics*, the result of Professor DRAPER'S investigations has already been alluded to; but the relation of these sciences to the varied metallurgical processes, on which we base the future of our vast territorial possessions; the advance made in the study of the nature of light; the successful use of the spectrum; the researches into the nature of the gases, indicate the work going forward and the possibilities in reserve.

In *Geology* and *Mineralogy* we may mention the valuable surveys carried forward by our government, under the charge of WHEELER, and COPE, and WHITE, and HAYDEN and KING, embracing large sections of Nevada, Utah, Colorado, New Mexico, Idaho, Arizona and the western half of Wyoming. The results of these surveys, conducted by men of ability and of large experience, with an able corps of assistants, are looked to with eagerness. The meetings of our own Academy have borne witness to the special interest we have in many subjects which have received careful attention in the progress of these surveys. We may remark, too, the progress being made in our state surveys. The researches made in Europe and Asia are also noteworthy. But the attractive details which press upon us from various quarters, time forbids our entering upon. We look with interest to the International Geological Congress, which meets in Paris during the coming summer, and at which I trust our Academy may be represented.

In the department of *Botany* much is expected from the examinations made during the past season by Sir JOSEPH D. HOOKER, the accomplished Director of the celebrated Kew Gardens, and Professor ASA GRAY, of Harvard University, having in charge the Government Botanical Survey of the Territories of Colorado, Wyoming, Utah, Nevada and California. The brief and fragmentary statements which have come to us of their work and some of the results, lead the world to look with interest for the forthcoming full report.

In connection with the various surveys which have been alluded to, *Zoological Science* has been represented by men of known attainments in its several departments. It has devolved upon them to collect specimens, and study the habits of every form of animal life. From these sources a vast amount of information has been secured, and extensive additions have been made to the collections in the various museums of natural history in this country. In Marine Zoology, through the efforts of Prof. BAIRD, of the Smithsonian Institution, who also occupies the important position at the head of the United States Commission of Fish and Fisheries, large collections have been made, from which duplicates, by gift and exchange, have been generously distributed to kindred organizations. It is fitting that, on this occasion, mention be made of the obligations our Academy is under to the Smithsonian, for its long-continued liberality towards us.

I cannot omit mention of the great advance in *Geographical Science* during the past year. Without time to enumerate the Arctic expeditions dispatched from Europe and this country, I must be content with briefly noticing the grand event of the year, the successful exploration by STANLEY of the river Congo, from the lake region of eastern Africa, through twenty degrees of longitude to the Atlantic. Worn by sickness and famine, harassed by desperate fighting with hostile natives, with indomitable courage and endurance he made his way through the five or six thousand miles of the river's course, and his year's work was complete;—a highway was opened through a continent,—a highway for commerce, for civilization, for christianity! Another has said, "Imagine the whole descent of Niagara and the rapids below down to Lake Ontario, to be doubled, and spread through a space of two hundred

miles ; then pile the rocky cliffs on each side to a height of two thousand feet, instead of two or three hundred, and through this gorge pour a river with three times the volume of the Mississippi. Now place two white men, with more than a hundred Africans under them, all utterly ignorant of what lay before them, in half a dozen rude canoes, and bid them make their way down this gorge, over its rapids, and around its three score cataracts. This is what STANLEY undertook to do, and did."

OUR SCIENTIFIC OPPORTUNITIES.

Thus, my friends, have we briefly considered subjects which seemed especially appropriate to this occasion. Justice, however, would not be done, either to you or to the Academy, did I not at this time, in addition to a record of work accomplished, and a sketch of the possibilities dawning upon us in the realm of scientific investigation, indicate vital relations which this institution bears to the citizens of Chicago. Every individual who apprehends the value of scientific truths, sustains responsibilities to the Chicago Academy of Sciences. It may seem superfluous, at this day, to array arguments to prove the advantages of scientific pursuits ; and yet, the comparatively recent introduction of science as a prominent element in education may justify its consideration. Foundations have been laid in this Academy, at the cost of years of effort and self-denial, whose benefits, resultant to us and to our children, every consideration proves to be of value.

I might speak, recalling to your minds the pressure upon brain and muscle in this over-driven city, of the health-giving, recreative power of scientific pursuits ; while to the necessity of the introduction of such an element into the business and professional life of Chicago, our medical friends would bear united testimony. Especially in the natural history department of science is this true, where the study of the habits of animal life and the collecting of specimens are conducted in the free air and sunshine. And here let me speak of the favorable location of Chicago for the prosecution of such a taste ; for, unpromising as our environs may appear to the ordinary observer, the region around us furnishes one of the richest fields in our land for the collection of specimens of natural history. Allow me to specify a moment.

In *Icthyology*, we have at hand not only the fish of our great inland seas, but the different varieties of the streams which flow into the gulf of Mexico.

In *Botany*, the extensive herbarium of the Academy, destroyed in the great fire, the life work of Dr. SCAMMON, and also the collections of our first Vice-President, Professor BABCOCK, bear testimony to the exuberant flora of prairie and forest about us.

In *Ornithology*, in addition to the well known proximity of the migratory lines of the vast flocks of waterfowl, as they pass to and fro between their northern and their tropical homes, it may not be generally known that we are located near the base of the triangular forest area, extending from the southern line of our lake basin to a point seventy or eighty miles to the north, which has furnished some of the rarest specimens in this department found in our zone. Indeed the birds of the arctic and tropical regions here meet. I learn from our Secretary that the opportunities for collecting specimens of *Insect Life* about our lake are equally good.

THE ACADEMY AN EDUCATOR.

Let it be borne in mind that our Academy is an educational institution, in full sympathy with the schools and colleges about us, and ever ready to aid in any investigations, or to distribute specimens from our own collections. Did time permit, it would be stimulating to effort to speak of many who are now valuable contributors to scientific knowledge who received their first impulse or guidance within its walls. Our primary object is to encourage thorough scientific study. The Museum of mounted specimens delights the popular eye, but this is not its chief value. Taken in connection with the specimens unmounted and concealed from view, and the Library, it furnishes to the student all appliances necessary for accurate investigation. And it is this close observation and careful comparison which is giving to the study of natural science its rightful place as a means of mental discipline. My friends, would not this thorough study, were it the rule rather than, as oftentimes, the exception, develop the unity and harmony between all departments of truth? Should we not hear less of the antagonism between science and revealed religion, did the defenders of each thoroughly investigate and fully comprehend the related truths?

Does not this practical line of thought quite naturally conduct us to the influence upon character of scientific pursuits? I need not dwell, in such a gathering as this, upon the need there is in our community of influences, elevating, controlling, permanent. The very faces one meets in the busy thoroughfares tell of the want of that food for thought without which all true culture is unattainable. There is an uplifting power in identifying oneself with a great cause; there is a transforming power in association with men engaged in a noble pursuit. To many of us, in our busy lives, this is all of science we can compass; but from such practical sympathy and intercourse with men of science—and we have found them in this Academy—there comes a reflex influence of deepest value. In the study of nature we are brought near to the God of nature,—to eternal verities; and in such presence, shams, pretence, policy, hide themselves, and character tends to what is simple and true. Did you ever see a river flowing over a broad and shallow bed, useless, with all its wealth of waters? Have you seen the same stream when engineering skill had, with granite walls, arrested the current and guided it into a deep, quiet channel, ready to turn the wheels of the factory or float the wealth of commerce? Thus, in our lives is needed a power that shall arrest the tide of frivolity and turn life's energies to noble ends.

There is, perhaps, no field upon which the influence of science bears more directly than that of invention. The history of civilization, since the revival in the fifteenth century, abundantly corroborates this statement. I am aware that some of the most noted discoveries and inventions have been attributed to circumstances purely accidental. The swinging of a cathedral lamp, it is affirmed, suggested to GALILEO the laws controlling the movements of the spheres; the falling of an apple, to NEWTON, the law of gravitation; and the accidental juxtaposition of spectacle-lenses, to the Dutch spectacle-maker, the telescope. But these incidents were the occasion and in no sense the cause of these discoveries. They revealed the men to themselves; made objective what had before been subjective. It was previous profound thought and study which gave to these trifling incidents their deep significance. Abstract thought must precede the most valuable practical results. The simplest movements, and processes, and machines, have re-

quired long and patient study of nature's hidden laws to bring them to their present state of perfection and usefulness. We may consider each new discovery, even the most trifling, important in its relations. It opens the way for another, and so, on and on; each point gained, a stepping-stone to a higher point beyond. It is needless to trace further the intimate necessary connection between scientific training and these practical applications of the forces of nature.

THE VALUE OF SCIENCE TO CHICAGO.

I may be permitted to add a few thoughts upon the economic relations which science holds to our city, and, indeed, to the country upon which we are dependent. Until within a few years, Agricultural Chemistry, widely adopted in the older States, was practically unknown here. Our western soil gave no indications of the need of replacing those elements withdrawn by our abundant harvests. Now the discussions of the Farmers' Clubs throughout the Northwest, indicate the vital importance of the intelligent application of scientific principles to farming in all its different branches.

Arboriculture, in its climatic relations; *Insect Study*, with its vast results, beneficial beyond computation, are illustrations of the scope of our subject, which I can only enumerate. A similar progress is observed if we look at the mechanical and manufacturing interests of our city, as developed within a few years; and here, did time permit, could be found proof abundant and conclusive of the necessity of uniting science with these pursuits, if we would successfully compete with the skilled work of other localities. Personal identification with these interests would lead me, were it possible, to develop more fully this branch of the subject; I can barely allude, however, to what has doubtless already suggested itself to you. Take away from our city its producing and manufacturing interests in iron, steel, lead, copper, zinc, leather, glass, oils, chemicals, etc., and you rob her of a chief element of her present and prospective power.

I have thus, my friends, endeavored to place before you, though imperfectly, some of the claims which our Academy of Sciences has upon you. You know its history; you know something of its work,—unselfish work, accomplished during the twenty years of its existence, for this city, this State—yes, the whole Northwest. I

do not need to interpret the figures presented this evening by our Treasurer; they speak a language unmistakable. The Academy is in pressing want of what this city can give. There are those among us who need return but a tithe of the wealth which Chicago has given them, to place the institution upon a basis strong and enduring. There is no monument one can raise to perpetuate his memory, so enduring, so honorable, so beneficent, as connection with such an organization. You need not journey to the distant cemetery to find his name upon an isolated shaft, you find it *here*—in a Building, Library, Museum, Lectureships—perennial sources of intellectual cultivation and power, which will cause it to be spoken with reverence and affection, as the years roll on.

IN MEMORIAM.

Fellow Members of the Chicago Academy of Sciences:

In closing an official connection to which your partiality has a second time called me, allow me to give a few moments to the memory of those gone from us; whose feet tread no more these mortal paths, but whose power is present to-day, and will remain a perpetual legacy.

First would I recall him whose face looks down upon us from yonder wall; whose youthful enthusiasm furnished the inspiration of the earliest efforts for the Academy, and who, at last, in distant Arctic regions sacrificed his life, a martyr to science—ROBERT KENNICOTT. There are some here, and among them one whose means, generously supplied, rendered it a success, who have not forgotten that first Arctic American Expedition. Novel in its inception, and in the mode in which it was conducted, through his indomitable energy did KENNICOTT secure to the Smithsonian and our own Academy, for the first time, a fair representation of the fauna of the lower Arctic latitudes. We well remember, too, the second expedition, in the spring of 1865, undertaken under the auspices of the Western Union Telegraph Company, to Northwest America, into which, in spite of delays and complications, unworthy opposition and disappointments, he threw himself with all his wonted ardor,

and found—a grave! Though he died at thirty, the halls of the Smithsonian Institution, and his brief publications, bear testimony to the value to science of the life of ROBERT KENNICOTT.

His successor, WILLIAM STIMPSON, whose portrait is before you, came to us in his early manhood, already a ripe scholar; and for seven years, from 1865 to 1872, was our honored Secretary. With educational advantages of the highest order, with rare facilities for securing a practical as well as theoretical acquaintance with nature, and with ability and perseverance to improve every opportunity, he early won that world-wide reputation, which, on his coming among us, at once gave our Academy an honorable position among kindred organizations at home and abroad. The insatiable demon of Fire, on that fatal October night, compelled no more precious sacrifice than the broken heart of STIMPSON. His life-work,—the beautiful drawings and manuscripts of an extensive treatise on Mollusks, which for a generation would have been of universal authority, lay in ashes; and with failing health there was not courage to begin again. A cruise in the Gulf, and the constant ministrations of friends, failed to restore; and he returned to wife and children but to die. The Academy and this city lost, in STIMPSON, not only the accomplished scientist, but also one who inspired in others the same zeal which animated his own life. Of the close intimacy of his friendships, I may not trust myself to speak.

To Col. JOHN W. FOSTER, LL.D., President of the Academy during the three years from 1870 to 1872, I will only allude. The worthy memorials of his life, presented in this room a few weeks since, are fresh in your remembrance, and I could add nothing to their weight. I would call your attention to the noble likeness we have of him in marble, a recent gift to the Academy.

But, my friends, this hour of reminiscence would be incomplete did I not go further back than the present incorporation of this Academy, to the organization which preceded it, and to which we owe more than appears upon the pages of our records. Many present this evening will remember the genial face of one who, twenty years ago, was elected its first President—JAMES VAN ZANDT BLANEY. Occupying the chair of Professor of Chemistry in the Rush Medical College, and conducting business also as an analytical chemist, in which department he was authority, he was yet ever

prominent in forwarding the interests of the Academy. Up to the time of his last illness, his was a well-known voice among us, giving valuable information on an unusual range of topics, and often the deeply interesting results of his own delicate experiments.

We are also reminded this evening of Dr. FRANKLIN SCAMMON, for two years President of the Academy. Retiring from active business in 1852, he devoted his time principally to botanical studies; and before his decease, which occurred in 1864, he transferred to the Academy his large and valuable herbarium, which probably had no rival as a complete collection of the flora of the lake basin and the prairies. Quiet, unobtrusive in his manners, his voice seldom heard in our meetings, except on his favorite theme, his life work was not lost. He increased the domain of knowledge; he inspired many in the walks of science; and in the transactions of kindred societies, at home and abroad, his name holds an honored place.

One other name would I mention in this memorial list—President of the Academy for three years, from 1858 to 1861—JOSEPH DANA WEBSTER. A few present will recall General WEBSTER when, over thirty years ago, fresh from Dartmouth and West Point, and his early successes as Lieutenant of Topographical Engineers, he first made his home in our young city. With what was true in science and art and literature, in those early days, he was prominently identified. With others, he united, in 1857, in organizing the first Academy of Sciences, of which he was the first Vice-President. He ever lent to it his cordial support; and found, in connection with it, opportunities for intellectual culture and grateful recreation. His thorough scientific training was displayed in what was accomplished by him as President of our first Board of Public Works. At the outbreak of the late war he volunteered his services to his country; and his record, honorable alike to himself, his city, his state, is known to all. When, at the close of the war, he again returned to his home, it was to accept offices in our city, the highest trusts in the gift of the government; and amid all the plottings and briberies and intrigues of those trying days, he pursued his even course, while never a breath of calumny tarnished his fair name. In March, 1876, General WEBSTER passed away—our Chevalier BAYARD—"A knight without fear and without reproach."

FINANCIAL REPORT.

BOARD OF TRUSTEES, ACADEMY OF SCIENCES,
January 21, 1878.

E. W. BLATCHFORD,

President of the Academy of Sciences:

The Board of Trustees have directed the following report to be made, for the past year :

RECEIPTS.

Cash on hand January 1, 1877,	-	-	-	-	\$ 399 24
Received from rents of store,	-	-	-	-	4,595 00
“ from initiation fees,	-	-	-	-	60 00
“ for annual dues for 1877,	-	-	-	-	190 00
“ “ “ previous years,	-	-	-	-	60 00
“ from annual subscribers,	-	-	-	-	270 00
“ on subscription notes,	-	-	-	-	1,350 00
“ for interest on same,	-	-	-	-	125 10
“ for cost of gas, etc., in library, for meetings,	-	-	-	-	15 00
Total receipts,	-	-	-	-	<u>\$7,064 34</u>

EXPENDITURES.

Paid Dr. J. W. Velie,	-	-	-	-	-	\$1,325 00
“ Janitors,	-	-	-	-	-	288 00
“ Freight,	-	-	-	-	-	102 79
“ Materials for taxidermy,	-	-	-	-	-	79 29
“ Coal,	-	-	-	-	-	69 50
“ Printing and stationery,	-	-	-	-	-	104 10
“ Sundries, postage, gas, etc.,	-	-	-	-	-	189 44
“ Water rent, two years,	-	-	-	-	-	44 48
“ Taxes,	-	-	-	-	-	574 90
“ Insurance on buildings,	-	-	-	-	-	369 91
“ “ “ specimens and fixtures,	-	-	-	-	-	111 09
“ Interest,	-	-	-	-	-	3,661 26
Balance,	-	-	-	-	-	<u>144 58</u>
Total,	-	-	-	-	-	<u>\$7,064 34</u>

Respectfully submitted,

GEO. C. WALKER,

Sec. of Board of Trustees.

REPORT OF THE SECRETARY.

E. W. BLATCHFORD,

President of the Academy:

ROOMS OF THE ACADEMY,

Jan. 22, 1878.

Dear Sir—I have the honor to present the accompanying report upon the Library and the Museum, for the year just closed.

Very respectfully,

Your obedient servant,

S. H. PEABODY, *Secretary.*

THE LIBRARY:

CORRESPONDENCE.

While the ashes were yet white upon the embers of the Academy, Dr. STIMPSON addressed a circular to kindred societies in Europe and in America, detailing the extent of our calamity, and inviting sympathy and help. The responses were immediate and hearty. Societies abroad, which had before exchanged only their current publications, opened their reserved stores and sent entire series, dating as far back as their issues were yet in print. In many instances the gifts were accompanied by letters of condolence and of encouragement, expressed in the kindest terms. Societies at home were equally cordial and generous in the assistance which they lent to the restoration of our library and museum. With few exceptions, the correspondents of the Academy have continued to forward their publications, to the present time. Their forbearance in keeping its name upon their exchange lists, while it has made no response,

demands the liveliest gratitude on its part. The Academy has incurred, in the reception of these gifts, a large indebtedness—a debt of honor, to which it is keenly sensitive, and which it must begin to pay at the earliest possible moment.

Before Dr. STIMPSON'S circular had elicited many replies he was called to his rest. Members were engrossed in the arduous struggle of rebuilding—not merely the Academy, but the city and their fortunes. It may not be generally known that the first part of the second volume of the Transactions was in the hands of the binder at the time of the fire. Publication was suspended; at first, during the rebuilding; as the event proved, for years. The long vacancy in the office of Secretary, prevented even the proper acknowledgment of the donations received. When the present incumbent entered upon his duties, in November, 1876, he deemed attention to this defect a duty of paramount importance. The matter which had accumulated was assorted and collated; lists were made of that from the several sources, and letters of acknowledgment and apology were transmitted to

Societies, American.....	32
Individuals, “	28
Societies, Foreign	110
Individuals, “	7
<hr/>	
Total correspondents.....	177

This work gave opportunity for temporary arrangement of the foreign publications in the convenient and spacious case loaned by the President and now in the office.

Some outlay should be made for binding and for pamphlet cases, to make these exceedingly valuable documents conveniently accessible. Still, every paper, pamphlet or volume in the possession of the Academy is in a definite place, whence it can be quickly produced on demand.

CATALOGUES.

The bound volumes have been entered in the Catalogue of Accessions. Parallel with these entries a card index has been written up. In it, references are made in the usual manner, not merely to the volumes on the shelves, but to each paper of scientific interest, as if forming a volume by itself. Work upon these catalogues was sus-

pended in midsummer, on account of the preparation of museum material for the Industrial Exposition. It will soon be resumed, and continued as fast as circumstances will permit. In this way the wealth of our Library, in some departments greater than before the fire, will be brought within reach of members and others who may desire to consult it.

The number of books will be exactly known when the Catalogue of Accessions is complete. At present we must be content with the following approximations :

Volumes, bound.....	800	
“ unbound.....	900	
		1,700
Pamphlets.....		1,000

BUST OF COL. FOSTER.

At the first regular meeting of the current season, in October, 1877, the Library was graced by the reception, with appropriate memorial services, of the bust of Col. JOHN W. FOSTER, LL.D., late President of the Academy. It is the work of our Chicago sculptor, LEONARD W. VOLK. As a portrait, it is true; as a work of art, superb. The expense of the work has been defrayed by a subscription, the chief donors being the artist and the late Col. SAMUEL STONE, a life-member of the Academy. A worthy memorial of a worthy man, its presence honors the givers, the artist, the subject, and the Academy.

ACCESSIONS.

The Library has received additions during the past year from the following sources :

FOREIGN.

- The Royal Society, of London.
- The Royal Society, of New South Wales.
- The Public Library, of Melbourne, Australia.
- The Cobden Club.
- The Meteorological Office, of Toronto.
- The Entomological Society, of Ontario.
- The Royal Academy of Mauritius.
- The University of Christiania, Norway.

- The Royal Danish Society of Science, at Copenhagen.
- The Royal Academy of Science, at Amsterdam.
- The Society of Sciences, of Holland, at Harlem.
- The Imperial Society of Naturalists, of Moscow.
- The Natural History Society, of Bamberg.
- The National History Association, at Bremen.
- The Silesian Society of National Culture, at Breslau.
- The Natural History Association, at Brünn.
- The Natural History Society "Isis," at Dresden.
- The African Society, at Dresden.
- The Physico-Medical Society, at Dresden.
- The Royal Academy of Leopold Charles, at Dresden.
- The Geological Society, at Dresden.
- The Natural History Society, at Danzig.
- The Natural History Society, at Emden.
- The Natural History Society, at Frankfort-on-the-Main.
- The New Society of Natural Science, at Frankfort-on-the-Main.
- The Royal Society of Natural Science, at Göttingen.
- The Natural History Society, at Halle.
- The Natural History Association, at Hamburg.
- The Natural History Society, of Schleswig Holstein, at Kiel.
- The Physico-economical Society, at Königsberg.
- The Royal Saxon Academy of Sciences, at Leipzig.
- The Association of Geologists, at Leipzig.
- The Natural History Association, at Lüneburg.
- The Natural History Society, of Mecklenburg.
- The Royal Bavarian Academy, at Munich.
- The Royal Hungarian Society of Natural Science, at Pesth.
- The Royal Observatory, at Prague.
- The Royal Bavarian Botanical Society, at Regensburg.
- The Zoological-mineralogical Society, at Regensburg.
- The Zeitschrift for Entomology, at Stettin.
- The Imperial Academy of Natural Sciences, at Vienna.
- The Imperial Geological Academy, at Vienna.
- The Physico-medical Society, at Würzburg.
- The Royal Academy of the "Lynx," at Rome.
- The Royal Lombardic Institute, at Milan.
- The Tuscan Society, at Pisa.
- The Adriatic Society, at Trieste.
- The Royal Observatory, at Madrid.
- The National Museum, at Mexico.
- The Natural History Society of Neuchâtel, at Zurich.
- The Society Vaudoise of Natural Sciences, at Lausanne.
- The Natural History Society, at Bordeaux.
- The Linnean Society, at Bordeaux.
- The Society of Natural History, at Cherbourg.
- The Society of Natural History, at Toulouse.
- The Society of Historical and Natural Sciences of the Yonne, at Auxerre.

The Belgian Entomological Society, at Brussels.
 The Belgian Conchological Society, at Brussels.
 Dr. Alexis S. Ulrich, Bremen.
 Dr. Frederic Roemer.
 M. ——— Melsens, Brussels.
 Dr. Ferdinand von Müller, Australia.
 Count Leopold Hugo, Paris.
 Prof. P. F. Reinsch, Erlangen.
 Sr. Joaquin Manuel de Macedo.
 Henri de Saussure, Geneva.
 H. N. Moseley.

AMERICAN.

The American Association for the Advancement of Science.
 The American Academy of Arts and Sciences.
 The Peabody Museum of Archæology and Ethnology.
 The Museum of Comparative Zoölogy.
 The Philadelphia Academy of Natural Sciences.
 The Boston Natural History Society.
 The Essex Institute.
 The Buffalo Academy of Sciences.
 The Davenport Academy of Sciences.
 The Torrey Botanical Club.
 The Natural History Society of Wisconsin, at Milwaukee.
 The Smithsonian Institution.
 The Zoölogical Garden, at Philadelphia.
 The American Philosophical Society.
 The Illinois Museum of Natural History.
 The Ann Arbor Scientific Association.
 The Illinois State Microscopical Society.
 The Wisconsin Academy of Sciences, Arts and Letters.
 The Cincinnati Observatory.
 The Peabody Institute, at Baltimore.
 Silliman's Journal of Arts and Sciences.
 The Canadian Naturalist.
 The Canadian Entomologist.
 The Science Observer.
 The Gas-light Journal.
 The American Book-seller.
 The Pharmacist.
 The Prairie Farmer.
 The Standard.
 The Geological Survey of Ohio.
 The Geological Survey of Minnesota.
 The Geological Survey of Wisconsin.
 The Geological Survey of Michigan.
 The Geological Survey of New Hampshire.

The U. S. Geological Survey, by F. V. Hayden.
 The U. S. Geological Survey, by Clarence King.
 The U. S. Geological Survey, by J. W. Powell.
 The U. S. Naval Observatory.
 The Bureau of Navigation.
 The Coast Survey Office.
 The Commissioner of Education.
 The Library of Congress.
 The National Museum.
 The Patent Office.
 The U. S. Fish Commissioners.
 The Department of the Treasury.
 The Department of the Interior.
 The Department of War.
 Col. S. B. Lowe, Chattanooga.
 Dr. C. W. Hempstead.
 Prof. E. D. Cope, Philadelphia.
 Dr. W. E. Woodbridge, Washington.
 S. H. Scudder, Cambridge.
 Jno. M. Woodworth, M. D., Washington.
 Rev. S. D. Peet, Ashtabula.
 E. W. Nelson, St. Michaels, Alaska.
 Lt. A. W. Vogdes, Charleston, S. C.
 Francis A. Holmes, Charleston, S. C.
 Prof. O. C. Marsh, New Haven.
 Jas. W. Milner, Baltimore, Md.
 E. W. Blatchford.
 S. W. Burnham.
 S. S. Bliss.
 W. W. Calkins.
 R. Blanchard.
 S. H. Peabody.
 Prof. C. Gilbert Wheeler.
 Hon. Thos. Hoyne.

RECAPITULATION.

From Foreign Sources,	Quartos, 11	Octavos, 108	Pamphlets, 72
From American Sources,	" 22	" 52	" 116
	<hr/>	<hr/>	<hr/>
Totals,	33	160	188

THE MUSEUM.

COLLECTIONS.

Shortly after the opening of the year just passed, Dr. J. W. VELIE left for Florida, to collect for the Academy. He was absent from the 20th day of January to the 25th of May, during which time he scoured the western coast of Florida, from Cedar Keys to Key West, meeting with very marked success, sending and bringing home a rich harvest of valuable specimens. The labor connected with such collecting is no holiday amusement; the toil is arduous, the exposure severe, and the expense considerable—in this instance borne largely by Dr. VELIE himself. Particular credit is due him, and was recognized by resolution of the Academy, for the patience, zeal, skill and success which rendered this expedition notable.

The proceeds were :

Mammals.....	3 species.	
Cetacea	2	"
Birds.....	24	"
Eggs.....	12	"
Fishes.....	21	"
Turtles.....	4	"
Reptiles.....	8	"
Crustaceans.....	12	"
Insects.....	15	"
Echini.....	5	"
Mollusca.....	130	" some in large quantities.
Star Fishes.....	5	"
Corals and Gorgonias.....	12	"
Sponges.....	6	"
Archæological and Ethnological.....	4	"
Total.....	263	

This is an under estimate, as much of the material is in alcohol, and circumstances have prevented its full identification.

Since Dr. VELIE'S return, he has mounted and placed in the Museum all the fishes, including the *Ceratopterus Vampirus* or Devil-fish, a large and an infant porpoise, a large female saw-fish and a Jew-fish; also, two large turtles, a fine rattlesnake, and many other specimens of minor importance.

While Dr. VELIE was absent, Mr. W. W. CALKINS spent about two months in Florida, devoting his time chiefly to scientific observation and to collection. He returned to the Academy, bringing a large amount of valuable material, chiefly from the vicinity of St. Augustine.

THE EXPOSITION.

In midsummer, after some discussion, it was determined by the Executive Committee that the Academy should once more exhibit selections from its Museum at the Inter-State Industrial Exposition. For this purpose Dr. VELIE hastened to finish the fish which had been brought from the Gulf—one of which, the Devil-fish, was admitted to be one of the most attractive objects in the entire display of the exposition. Advantage was taken of this occasion to arrange and label all the conchological collection of the Academy, found to number about 1,100 species.

The Academy placed on view at this time:

- 5 cases of Shells and Star-fish.
- 1 " of Reptiles.
- 1 " of Mammals.
- 3 " of Birds.
- 1 " of Corals, Gorgonias and Sponges.
- 1 case and three large pyramids of Fishes.

This display was supplemented by the collections of members of the Academy, including,

- 1 case of Eggs and a very beautiful Albino Deer, from Dr. VELIE.
- 4 cases of Mound-Builders' Pottery and Implements, from H. N. RUST, Esq.
- 9 cases of Insects, from the Secretary.

From these sources came more than three-fourths of the entire exhibit in the Department of Natural History. That this depart-

ment was inferior to none in interest and instruction, the officers of the Exposition most cheerfully admit.

While other specimens were absent, opportunity was taken to repair and refit the case containing the KENT collection of birds, now in the best order.

CASTS.

During the summer it was determined that the Academy should fulfill its contract with Prof. H. A. WARD, of Rochester, N. Y., by returning to him from the collection of casts in its possession enough to liquidate the debt remaining upon them. With the kind assistance of Dr. ANDREWS, and the approval of the Executive Committee, casts were selected for this purpose. They were carefully packed by Dr. VELIE, and have been received by Prof. WARD. Although the majority of the pieces were sent away, the most instructive remain. Some of those dismissed might have been kept with profit, while others would hardly pay for the space which they would occupy.

ARRANGEMENT.

Much labor has been expended upon the collections, to make them more valuable to visitors and students, by the labeling of the shells already referred to, and by the labeling and arrangement of the eggs, minerals and fossils—the latter being placed stratigraphically, as far as possible. Most of the birds, fishes and mammals are also labeled; and this work should be continued, until everything placed on view shall give a succinct account of itself—shall present to the visitor its own card of introduction.

The immediate wants of the Museum are,

1. Suitable cases for compact display of the shells.
2. Glassware, for the distribution and display of specimens in alcohol.

With these it will be possible to place before the visitor nearly everything which the Academy now owns. Its stock of exchangeable material might soon procure very considerable accessions, which would demand yet more room.

MUSEUM CATALOGUE.

A task of much labor and of great importance yet remains to be performed upon the collection. Every specimen should be marked in some legible and indelible way, with ink or paint, or even with the point of a diamond. It should bear a number peculiar to itself, or not found on any other specimen of its own class. This number should refer to an entry in a Catalogue of Accessions, where all facts of name, collection, donation and value should be on record. Then it will be possible to know at any time what the Academy owns, what has been its increase, and what becomes of the material. This work, once brought up, may easily be made to keep pace with the growth of the collection. The present work of labeling and arranging leads systematically and directly to that, and will greatly facilitate its execution.

DONATIONS.

The donations of the year have been as follows :

- FLORIDA EXPEDITION—J. W. Velie, collector, already mentioned.
 W. W. CALKINS—80 botanical species ; 12 birds, mounted ; 1 box of ores ; 1 box of pottery, from shell mounds ; 3 boxes of fish, shells, and alcoholics.
 E. W. NELSON—48 species of fish ; 24 birds, mounted ; 2 boxes of fossils.
 Dr. J. W. VELIE—4 birds ; 11 species of eggs ; 1 fish ; 2 insects.
 THE SMITHSONIAN INSTITUTION—82 specimens of fish, in alcohol.
 HENRY K. COALE—1 mammal ; 2 birds.
 Dr. EDMUND ANDREWS—1 photograph ; 1 cast.
 S. C. CLARK—3 fish ; 1 specimen of wood ; 1 egg.
 ARTHUR PEABODY—1 box of minerals and ores.
 Dr. OLIVER EVERETT, Dixon, Ill.—2 boxes of Lower Silurian fossils, from Dixon.
 FRANK REILLY—1 fish.
 R. W. McILVIANE—1 fish.
 C. N. HOLDEN, Jr.—1 bird.
 Dr. P. F. REINSCH—1 meteoric stone.
 A. D. DAVIS—Flints and 4 species of minerals.
 GEO. P. WELLES—2 birds.

- H. C. FREEMAN, Alto Pass, Ill.—5 young foxes; 2 birds.
 PAUL BLATCHFORD—2 reptiles.
 Dr. F. O. C. RICHARDSON, St. Louis—6 photographs.
 O. S. WESTCOTT—1 bird.
 F. L. DEWITT—10 birds.
 W. C. EGAN—2 large slabs and 80 species of Chicago fossils.
 C. J. RONEY—21 species of minerals; 6 species of fossils.
 Lt. A. W. VOGDES, Charleston, S. C.—16 species of fossils.
 JAMES W. MILNER, Washington, D. C.—3 fish.
 W. H. SUMMERS—1 microscopical slide; 1 specimen of echinus.
 W. N. BALLOU—Eggs, chick and head of Arctic tern.
 GEO. F. CLINGMAN—2 birds.
 N. S. DAVIS, Jr.—1 egg of South American ostrich.
 RAY L. HARMON—2 birds.
 E. S. CHESBROUGH—4 specimens of fossils.
 A. S. TIFFANY, Davenport, Iowa—10 species of Devonian fossils.
 C. C. ABBE, Manatee, Fla.—1 beak of fetal saw-fish; 1 pair of jaws of whip-ray.
 Rev. J. R. HIBBARD—1 specimen of anatifera.
 A. M. SIMMONS—1 hairy calculus.
 EMIL DREIER—6 specimens of flint implements, from Iceland.
 Dr. E. M. HALE—1 stone pipe.
 E. W. BLATCHFORD—1 box of ores.
 G. F. KIRBY—7 specimens of Iowa marbles.

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